Communication on a listserv for health information professionals: uses and users of MEDLIB-L*

By Natalie A. Schoch, Ph.D.
Assistant Professor

College of Library and Information Services
University of Maryland
College Park, Maryland 20742
schoch@oriole.umd.edu

Sonya E. Shooshan, M.L.S.
World Wide Web Project Coordinator

Quantum Research Corporation
7315 Wisconsin Avenue, Suite 400W
Bethesda, Maryland 20814
shooshan@qrc.com

Background: Listservs offer the potential for participants to engage in a "virtual conference" with experts and colleagues from around the world. However, little research has been done to study the use and effectiveness of this means of communication. Methods: In April 1995, an electronic survey of MEDLIB-L subscribers was conducted to determine demographic characteristics and uses of the listserv. Results: Respondents worked predominately at academic institutions (45%) as members of large staffs (44%) in the United States (82%). The majority had worked as health information professionals for more than ten years. Nearly 90% of respondents read MEDLIB-L at work and most spent fewer than three hours per week doing this. More than half of the respondents read 41% to 100% of the messages distributed by the list, with fewer than 20% reading 91% to 100% of the messages. Respondents reported initiating and responding to reference questions and product information with greatest frequency. There was no relationship between years of experience in the profession and participation in listserv activities except in the category of posting information. Conclusions: This study describes communication activities on MEDLIB-L and the extent of subscriber participation in these activities.

INTRODUCTION

Electronic networks are considered to be increasingly important in facilitating communication among people and organizations. Individuals, businesses, educational institutions, and governmental organizations use the Internet and other electronic networks to communicate locally, nationally, and internationally. The growing use of this technology has led some to speculate that electronic networks will fundamentally change communication and may replace more traditional means such as the telephone and print media. The Internet has been heralded as the "ultimate democratizer," with the potential to bring every scholar and citizen within the reach of each other and the world's information resources [1].

Among the applications available on the Internet, the literature consistently reports that electronic mail (e-mail) is the most widely used function. In October 1995, it was estimated that there were more than thirty million e-mail accounts worldwide [2]. While e-mail is usually defined as a mechanism for one-to-one correspondence (or one-to-few), there is a related type of electronic communication that facilitates the commu-

* This project was supported in part by a General Research Board Summer Research Award from the University of Maryland at College Park.

nication of one-to-many. Electronic mailing lists such as listserv lists, mail reflectors, and USENET newsgroups, using various types of software, provide a venue for multiple users to communicate with each other over extended periods of time. In the case of listserv lists, usually referred to simply as "listservs," online discussion groups are maintained by listserv software that resides on a host computer at a sponsoring organization. Participants send messages to a central address and the listserv software then distributes the messages to each subscriber of the list. Messages can be sent to thousands of participants. These discussion groups are often topical in nature (e.g., CHEMINF-L is for the discussion of chemical information) although numerous lists are maintained by organizations (e.g., ASIS-L for the American Society for Information Science) or by self-identified groups (e.g., MEDLIB-L for medical information specialists). A catalog of electronic mailing lists on the World Wide Web (http://www.liszt.com) that boasts the "world's largest directory of mailing lists" reported 35,158 mailing lists from 989 sites in the April 14, 1996 update.

The potential benefits of online discussion groups exceed those of the more limited one-to-one correspondence of e-mail. Participants can use electronic discussion groups to keep abreast of new issues, discuss ideas, obtain answers from experts, and provide answers to others [3]. One need not identify and locate an expert or group of individuals with related interests; one simply sends a message to an appropriate list and presumably the experts and colleagues will respond. Akin to traditional conferences, the "virtual" conference allows participants to discuss ideas and query others, but, unlike face-to-face meetings, these exchanges do not oblige participants to take a day or more away from the job or expend funds for travel. In addition, participants in electronic conferences may post and answer questions and participate in discussions regardless of geographical location and social status (e.g., educational level, physical disability)—factors which have sometimes prevented certain individuals from participating in conferences and other types of informal networks. There are, however, some potential problems with this form of communication. For example, the level of competence of respondents is often difficult to determine. In addition, as will be seen later in this paper, the volume of messages may be high when participating in one or multiple listservs.

Other than discussing the potential benefits of electronic conferences and knowing that a great number of these discussion lists exist, little has been done to assess the effect of electronic discussion groups on users or their employing organizations. Who uses listservs and what do they use them for? Are listservs functioning to bring novices in touch with experts? How much time is spent participating in online conferences? What is the effect of this participation on employing organizations? The present study provides insight into these and other questions through a description and analysis of use and users of MEDLIB-L (medlib-l@listserv.acsu.buffalo.edu), a listserv discussion group for health information specialists that is currently managed by the Medical Library Association.

LITERATURE REVIEW

The efficacy of and user satisfaction with one-to-one or one-to-few e-mail communication has been described in many disciplines. Examples of such studies have been conducted in medicine [4, 5], science [6], education [7], business [8], and librarianship [9]. Although reports indicate that e-mail is used primarily for personal communications, it is also described as a tool for teaching in medicine and related disciplines [10, 11] and continuing education in nursing [12] and librarianship [13]. Hospitals use e-mail systems to alert clinicians to the status of patients, providing information about admissions, clinical conditions, and other important developments [14]. Neill examined the usefulness of e-mail for patient-physician communication and found that it was perceived to be good for simple and non-urgent problems such as refilling prescriptions and making appointments [15]. Steinfield's study of e-mail use at Xerox Corporation showed that it had a beneficial impact on work effectiveness, on inculcating organizational values, and in developing a sense of workplace community [16]. The literature is rife with anecdotal endorsements of e-mail's ability to promote personal and organizational efficiency by eliminating "phone tag" and reducing paperwork [17]. Messages can be sent regardless of distance, time, or location of the sender and recipient. For certain groups the ability to store messages and respond at a later time is a critical measure of the usefulness of the medium. A letter to the editor of an anesthesiology journal illustrates this point. The authors note, "E-mail is especially useful for physicians who have OR or ICU responsibilities because they often cannot accept and answer messages in real time" [18]. In addition, systematic surveys of users indicate a general acceptance and satisfaction with the medium. Surveys of e-mail users at several major hospitals revealed that e-mail is heavily used and that satisfaction is high [19, 20]. A survey of librarians on their use and satisfaction with e-mail had a similar finding [21].

Evaluations of the use and usefulness of electronic conferences are available in a number of disciplines. Montgomery and Keenan describe a computerized bulletin board system at the Medical College of Pennsylvania and Hahneman University that stores and organizes messages from listservs [22]. The service is reported to be popular and heavily used by faculty and staff. Woodward and Zolet reported on a computerized bulletin board system for medical residents to

exchange information. The conference-type electronic mail was the most popular use of this system [23]. Roiger provides an account of a discussion list for undergraduate communications majors at the University of Arkansas [24]. Initially a forum for discussion, the list eventually provided (1) a place to practice communication skills, (2) a source of communal fellowship, (3) a source of information to aid scholastic and career endeavors, and (4) a gender-neutral peer network. Berman studied patterns of participation in two social work listservs [25]. An interesting finding of this study was that the discussions, which were predominately "discussions of issues," were dominated by a small percentage of the participants, who were mainly academicians rather than practitioners. Similarly, Burton describes a study of an electronic mailing list that was dominated by academics [26]. He also notes that relatively few subscribers accounted for the majority of the participation in the discussions. Brown performed a content analysis of messages on two library-oriented listservs and developed a taxonomy of queries and responses [27]. Rosenbaum and Snyder investigated the emerging norms of computer conferences in a content analysis of messages from seven listservs [28].

The potential influence of electronic conferences on communication may be great. As noted above, taking part in an electronic conference could remove certain barriers that have traditionally hindered participation in conferences (i.e., geographic isolation and social status). In examining the literature on the significance of traditional conferences and informal information networks to communication processes in a discipline, the importance of the ability to remove these barriers becomes apparent. Studies of scientists [29] and physicians [30] have shown that personal collections and informal networks of colleagues, sometimes called the "invisible college," are crucial forms of information exchange within a discipline or sub-discipline. Gaining access to the "college" or other collegial groups can be impeded by any number of attributes of the potential participants. For example, Cronin noted that younger researchers or those in less prestigious institutions may find it difficult to penetrate collegial networks [31]. A University of Maryland chemist, Thomas O'Haver, Ph.D., conveyed a comment from a deaf participant in an electronic conference who noted that this was the first conference in which she felt she could fully participate [32]. That the electronic conference allows access by any individual† with a computer and an Internet connection to many "invisible colleges" suggests that these conferences may have a profound effect on communication. While a listserv does not provide complete anonymity, it can be difficult or impossible to know whether, for example, the poster is a graduate student, distinguished faculty member, or physically challenged person. It is important to note that while such anonymity may be useful for some individuals to gain access to the larger group, it may make it difficult to determine the validity of a response and the competence of the respondent.

METHODS

In April 1995, an electronic questionnaire was designed to gather information about the demographics and listserv activities of MEDLIB-L subscribers. MEDLIB-L was begun in January 1991 by Nancy Start at the Health Sciences Library, State University of New York at Buffalo as an unmoderated discussion list for health information professionals. The list is currently managed by the Medical Library Association. One open-ended question and nine objective questions were developed. The questionnaire was designed to be distributed over e-mail and was formatted to fit an eighty-character screen. The questionnaire was pilot tested on a physician, two library school students, and two professional librarians. A final version of the questionnaire can be found in the appendix.

After comments from the pilot test were analyzed and adjustments made to the questionnaire, it was distributed to selected members of the list. A list of subscribers was obtained by using the review-listserv command (rev medlib-l). At the time of this study there were 2,670 non-concealed subscribers, 28 concealed subscribers, and 8 non-concealed local node users. A random systematic sample of 335 subscribers was selected to receive the questionnaire. In cases where it was obvious that two names were the same, (e.g., nking@wam.umd.edu and Natalie_King@umail.umd.edu), only one occurrence of the name was used. A short batch program was written to rapidly distribute all questionnaires at once. Each questionnaire was sent individually and recipients were not aware of the identities of others who received the survey. Thirty-six hours after the initial mailing, thirty-five messages had been returned automatically by mail systems for having bad addresses. In cases where another e-mail address for that person could be found on the subscriber list, a copy of the questionnaire was mailed to the second address. In addition, another random sample of addresses was chosen to ensure that 335 subscribers were successfully reached via e-mail.

An introduction to the questionnaire explained the purpose of the study and asked recipients to complete and return the survey either electronically or through postal mail. Strict confidentiality was guaranteed to all

† It should be noted that not all listservs allow anyone to subscribe. Some listservs require that subscribers belong to a certain organization or have appropriate credentials. For example, POLICE-L (listserv@cunyvm.cuny.edu) is a listserv for police officers that is open only to sworn law enforcement officers, including retired, reserve, and auxiliary officers. Potential subscribers are warned that subscription requests are subject to employment status verification.

respondents. A deadline was given of approximately two weeks after the initial distribution. At that deadline, recipients of the questionnaire who had not yet responded were sent a second message and copy of the questionnaire. Responses were coded into categorical observations for statistical analyses. Statistical analyses were performed with Statistical Analysis System (SAS).

The daily listserv traffic (number of messages received by a subscriber) for each day during a randomly selected week in each month of 1995 was also determined.

RESULTS

A total of 149 questionnaires were returned through the original and follow-up mailings, yielding a response rate of 44%. The majority of respondents (84.6%) returned the questionnaires electronically. During the pilot test, an interesting circumstance was noted in that one of the librarians who was asked to assist in the pilot was surprised to find that she was listed as a member of the group, as she believed that she had "unsubscribed" approximately one year before the study. As a result of this incident, the first question posed to recipients of the questionnaire was whether or not they believed they were MEDLIB-L subscribers. Twenty-one questionnaires were returned by recipients who believed themselves no longer to be MEDLIB-L subscribers. Their surveys were not considered further, leaving a total of 128 usable questionnaires and an adjusted response rate of 38%.

Demographic information about participants was collected in areas of organizational affiliation, primary occupation, number of professional staff at the institution, years of experience, and country of employment. With regard to organizational affiliation, 45% of respondents were employed at academic institutions, 19% at hospitals (including Veterans Administration), 10% in health sciences information centers, 13.5% in other libraries, and 2.4% in other health sciences institutions. The remainder (9.5%) classed themselves in organizations such as database vendors, other governmental organizations, library schools, insurance companies, and health maintenance organizations.

When asked the number of professional staff at their institutions, 44.4% of respondents indicated working at institutions with more than five professional staff, 35.2% were at institutions with one to five professional staff, and the remainder were employed in solo positions (20.4%). 83.1% listed their primary occupation as professional, 4.8% identified themselves as staff, 2.4% as other health professionals and 9.7% listed themselves in the "other" category. Such "other" occupations included accounts manager, library school student and faculty, quality assurance analyst, and systems operator.

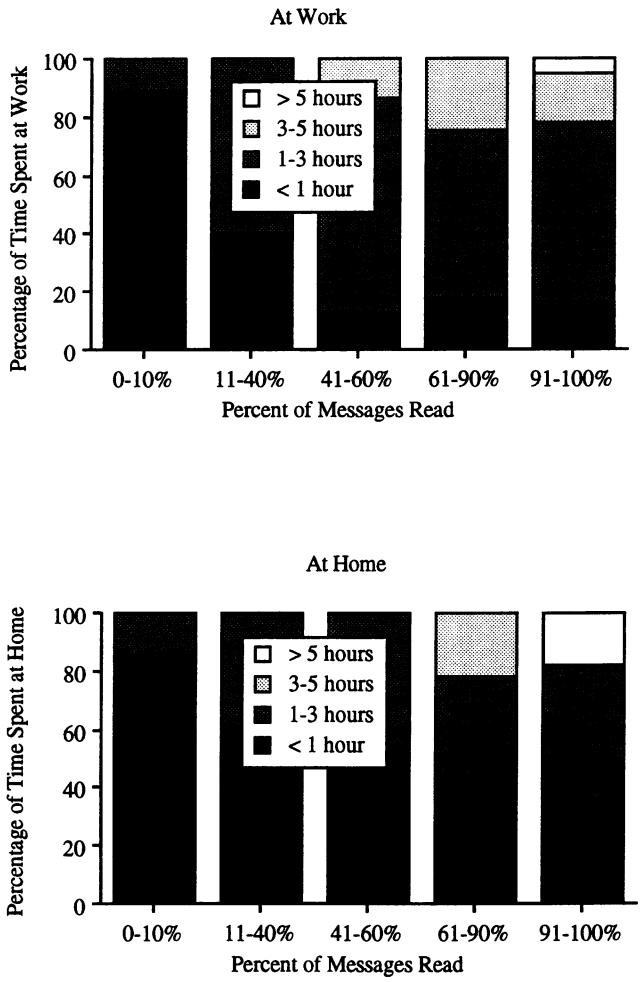
The question on years of experience revealed that the majority (58.5%) had been in the field of medical librarianship for more than ten years. A length of experience between five and ten years was reported by 20.3% of respondents, 14.6% responded that they had between two and five years' experience in the field, and only 6.5% responded that they had fewer than two years' experience. Respondents were predominately employed in the United States (81.7%), followed by Canada (6.3%), Australia (2.4%), Great Britain (1.6%) and other (7.9%).

Another series of questions concerned the length of time users had subscribed to MEDLIB-L and whether they used listserv features such as unsubscribing, setting the software to "nomail," and receiving MEDLIB-L in the digest mode. Unsubscribing is defined as removing a recipient's address from the mailing list. Setting nomail is a listserv command that allows the recipient to temporarily stop receiving mail from that list. The digest mode, which is not available to all users, allows a subscriber to receive all messages from one day in a single message rather than many individual messages. Sixty-six percent of the respondents indicated that they had subscribed to MEDLIB-L for more than one year. Nearly three quarters (72.1%) had been continuously subscribed, although 64.8% indicated that they had at some time set the list to nomail. At the time of the survey, 31% of respondents indicated that they were currently set to nomail. Digests were received by 21.7% of respondents.

Another group of questions concerned the length of time that subscribers spent reading and participating in the listserv. In the first of these questions, subscribers were asked to estimate the percent of MEDLIB-L items that they read. Of the respondents, 9.4% reported reading 10% or fewer of the messages, 26% read 11% to 40% of messages, 24.4% read 41% to 60%, 23.6% read 61% to 90%, and 16.5% read 91% to 100%. In a second question, subscribers were asked to estimate the length of time per week spent at home and at work participating in the listserv. Of the 128 respondents, 37.5% indicated that they spent time on MEDLIB-L at home and 89.8% indicated that they spent time on MEDLIB-L at work. Because there was also interest in whether the number of messages that respondents estimated that they read corresponded with the length of time spent reading and participating in MEDLIB-L at work and at home, a cross-tabulation between these variables was performed (Figure 1). The average number of messages received per day by a MEDLIB-L subscriber in 1995 was fifty on weekdays and twelve on Saturday and Sunday.

When queried about their participation in other listservs, nearly one quarter (24.6%) indicated that they subscribed to more than five other listservs. Nearly half (43.7%) indicated that they subscribed to between three and five additional lists, and 21.4% indicated

Figure 1
Relationship between the percentage of messages read and the number of hours per week spent on MEDLIB-L



that they participated in one or two additional lists. Only 10.3% did not subscribe to any other discussion list.

Recipients of the questionnaire were also asked to estimate the frequency and extent to which they participated in MEDLIB-L activities. In the first series of questions on this subject, subscribers were asked to give a general estimate of how often they asked and answered questions, initiated and responded to discussions, and posted information (Table 1). A correlation analysis of responses to these questions yielded a Cronbach coefficient alpha for standardized variables of 0.76, indicating a satisfactory level of reliability among the questions. Respondents were then given a list of specific types of participation and were asked to indicate whether they had ever initiated or responded to specific activities on the listserv (Figure 2).

Table 1
Percent of MEDLIB-L subscribers indicating the frequency with which they participate in various types of communication on the listserv

	Never	Less than once per month	Once per month to once per week	More than once per week
Ask questions	41.5	56.1	1.6	0.8
Answer questions	20.6	68.5	9.5	1.6
Initiate discussion	75.0	24.1	0.9	0.0
Reply to discussion	50.4	42.9	6.7	0.0
Post information	58.1	39.3	2.6	0.0

The Cronbach coefficients for questions on initiating activities and responding were 0.61 and 0.53, respectively.

Because we were interested in the extent to which experience in the profession correlated with listserv participation, a chi-square analysis of these variables was performed. In the original questionnaire, participants were asked the frequency (never, monthly, weekly and more than once per week; see Table 1) with which they asked and answered questions, initiated and replied to discussions, and posted information to the listserv. Because few respondents indicated participating at the higher frequencies, the data was collapsed into two responses, "never" and any participation regardless of frequency (Table 2). The only significant difference noted by the chi-square analysis was in the category of posting information ($\chi^2 = 7.374$, $p < 0.025$).

Approximately one-third of the respondents provided additional comments about their utilization of MEDLIB-L in the open-ended question. While some

Figure 2
Percent of MEDLIB-L subscribers who have initiated or responded to specific types of communication on the listserv

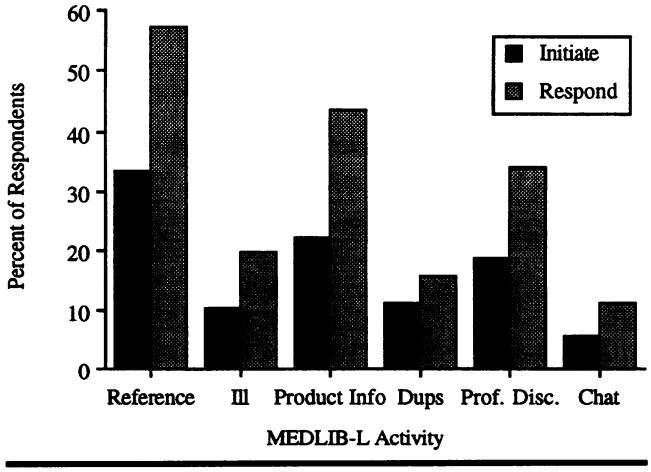


Table 2
Relationship between participation in various listserv activities and years of experience in the profession*

	Years of experience in the profession		
	<5 years	5–10 years	>10 years
Ask questions	69.2	47.8	59.2
Answer questions	84.6	66.7	84.7
Initiate discussion	24.0	13.0	29.2
Reply to discussion	40.0	54.6	52.2
Post information	25.0	30.4	72.9

*The values represent the percentage of respondents who have ever participated in that activity regardless of frequency. A chi-square analysis indicated that the only significant differences were in posting information.

participants found the listserv to be an excellent resource for information on professional issues and problems, others complained of "needless chatter" and "irrelevant material" such as items on duplicate journals and interlibrary loan (ILL) requests. Several very specific uses of the listserv were identified in this section, including being alerted to useful sites on the Internet and scanning the list only for job advertisements. A few respondents used this question as an opportunity to complain of local technical and equipment problems that prevented easy use of the listserv.

DISCUSSION

In a 1994 opinion paper, McClure expresses a need for research on the impact of networking on academic institutions [33]. He poses questions in areas where "additional knowledge is desperately needed," such as whether networking improves learning, whether there are certain demographic characteristics associated with network use, and whether faculty are more productive as a result of using networks. Undoubtedly, similar questions could be applied to other types of organizations. This study attempted to address issues related to the use of electronic conferences by medical information professionals.

With regard to demographic characteristics, the users of MEDLIB-L were predominately affiliated with academic institutions (45%) as members of large staffs (44% at institutions with more than five professional library staff) in the United States (nearly 82% of respondents) or countries where English is spoken predominately (10.3%). The majority had been members of the field of medical librarianship for more than ten years. This last fact is not surprising in light of the recent survey of Medical Library Association (MLA) members which revealed that 67% of MLA members were forty years old or older and 49% had been in the profession for more than fifteen years [34]. It is likely that there is considerable overlap between members of the list and members of MLA.

Likewise, there are no surprises in the other characteristics. It is widely recognized that academic institutions in the U.S. have been active developers and users of electronic networks. In fact, the National Library of Medicine has a grant program, Internet Connections for Medical Institutions, which explicitly encourages hospitals to apply for funds to assist in providing network connections for health care workers. Of twenty-five grants awarded in 1995, twelve went specifically to hospitals or medical centers, and several others were granted to smaller organizations such as the American College of Obstetrics and Gynecology [35]. The results of this study are also in agreement with the study of listservs in social work, which revealed that most participants of the lists were from academic institutions [36] and that most e-mail users in a study of librarians were from academic libraries [37]. The predominance of participants from the United States and English-speaking countries can be explained by the fact that the *de facto* language of this listserv group is English.

The survey questions on the length of time subscribed and use of listserv features revealed that a majority of members of the list had subscribed to MEDLIB-L for more than a year and that they had subscribed continuously during that time. Although many indicated that they had used the nomail command and nearly one-third indicated that they were currently set to nomail, it is apparent that many members of the list find membership in the group to be valuable enough to warrant continued subscription. However, that such a high percentage were set to nomail or had used the feature in the past suggests that there may be some difficulties associated with continuous participation in this list. Such difficulties may be the high volume of message traffic on this list (an average of fifty messages on weekdays) and the perceived excess of trivial comments and lack of relevant material as indicated in the responses to the open-ended question. It should be noted that since the completion of this study the listserv managers have attempted to reduce instances of messages that are not of broad interest to the participants. For example, instead of posting messages about exchanging duplicate journals to MEDLIB-L, members are encouraged to send these requests to BACKMED-L (listserv@sun.readmore.com), and ILL requests are to be made on the list only as a last resort.

Related to the issue of why such a high percentage of respondents were set to nomail is the response to the question about the amount of items read. More than half of the respondents read a large proportion (41% to 100%) of the messages distributed by the listserv. However, that fewer than 20% of respondents claimed to read 91% to 100% of the messages indicates that the majority of MEDLIB-L participants did not find the entire enterprise useful and are probably filtering messages that they believe to be the most relevant or useful.

Nearly 90% of respondents indicated that they read MEDLIB-L at work. The fact that the listserv traffic is much greater on weekdays than on weekends provides further evidence that participation in MEDLIB-L is probably an on-the-job activity. Looking at the cross-tabulation between percent of messages read and time spent at work (Figure 1), it is apparent that the majority of subscribers report to spend fewer than three hours a week reading MEDLIB-L at work. However, one to three hours per week could represent a significant investment of time from the work week spent on a single conference. This is especially noteworthy when considering the responses to the question about participation in other listservs. Nearly one quarter of MEDLIB-L participants reported to subscribe to more than five other listservs and nearly half subscribe to three to five additional lists. If the other listservs have comparable traffic, levels of individual participation, and are read at work, then listserv participation may be a substantial addition to work load.

Another interesting observation from this study comes from the responses of those claiming to read a high percentage (91% to 100%) of the MEDLIB-L messages. Although nearly 80% report that they spend fewer than three hours a week on MEDLIB-L, some (16.7%) indicate that they spend less than one hour a week participating in the list. Although it is possible that this group is reading MEDLIB-L at home, it may also be the case that they are either overestimating the number of items read or underestimating the time spent participating in the electronic conference. It is this second option that may be interesting to explore further. Anecdotal reports in the popular literature [38] and on college campuses [39] discuss "Internet addictions" wherein certain individuals may spend excessive amounts of time in the relative comfort of the controlled environment of the electronic network. Often these individuals do not recognize the extent of their involvement with the medium.

This study also explored the uses that participants make of the listserv and the extent to which individuals participate in listserv activities. Figure 2 describes the participation of respondents in a number of activities that had been observed with some frequency on the list. It is noteworthy that initiating and responding to reference questions and product information are the activities in which the most respondents have participated. It is also notable that respondents to the questionnaire reported responding to all types of activities more often than they initiated them. Professional discussion is the third most commonly initiated and responded to activity. This contrasts with other reports in which professional discussions were the most frequent activities on the observed listservs [40, 41].

It is interesting that most listserv subscribers participate actively in few activities with regularity (Table 1). Only asking and answering questions are performed by more than 50% of respondents, and even these activities are reported at the lowest frequency (less than once per month). Engaging in discussions and posting information are infrequently or never done by most respondents. Low frequency of participation by most members appears to be in agreement with other studies that note that most listserv activity is dominated by relatively few participants [42, 43].

The cross-tabulation between length of experience in the profession and the extent to which participants perform various activities (Table 2) examines an assumption that is often posited when discussing the advantages of listservs, namely that listservs provide novices in a field with the opportunity to interact and gain information from experts or at least members of the field with greater experience. In this study, the statistical analysis revealed that there is no relationship between years of experience and asking or answering questions or in initiating or responding to discussions. The only case in which it appears that users with the greatest experience participated more than novices is in posting information to the list. That novices and experts participate in most activities in equivalent numbers indicates that the advantage of the listserv may be less in novices drawing upon the wisdom of distinguished elders and more in having a community for searching for information and participating in open discussions. This study did not address the effect of other variables such as physical disabilities, gender, or other factors that might influence participation.

This study offers a glimpse into the communication activities on a listserv for health information professionals. It appears from their continued subscription that many members find the list useful yet few actively participate with regularity. The most frequently performed activities were asking and answering reference questions and discussing products and procedures. Members with little experience in the field participate in most activities to the same extent as members with considerably greater experience.

These results suggest a number of additional studies. For example, a comparison of institutional support for travel to conferences versus support for listserv activities could be used to estimate the value of listserv participation as a professional activity. An examination of private correspondence between subscribers might also provide information on the extent to which listservs influence communication flows between members in a professional group. It would also be worthwhile to examine the effect of additional factors such as physical disability, gender, and geographic isolation on the use of the listserv.

ACKNOWLEDGMENTS

The authors are grateful to Mamdouh Sharara at the University of Maryland Statistics Laboratory for his

advice and assistance with statistical analyses. We are also grateful to John Coffey, M.I.L.S. at Michigan State University for his comments on the manuscript and to Juliet Conlon at the University of Maryland for her editorial assistance.

REFERENCES

1. LANGENBERG DN. The lonely scholar in a global information environment. In: Creth SD, Boynton R., eds. Symposium on Scholarly Communication. Westport, CT: Meckler, 1993:27–40.
2. DEGGANS E. The new marketplace of ideas. PC Novice 1995 Oct;6(10):71–4.
3. MONTGOMERY CH, KEENAN P. Facilitating faculty communications using an electronic bulletin board to store and organize listserv messages. Bull Med Libr Assoc 1995 Apr;83(2):234–7.
4. SANDS DZ, SAFRAN C, SLACK WV, BLEICH HL. Use of electronic mail in a teaching hospital. Proc Annu Symp Comput Appl Med Care 1993:306–10.
5. SINGARELLA T, BAXTER J, SANDEFUR RR, EMERY CC. The effects of electronic mail on communication in two health sciences institutions. J Med Syst 1993;17(2):69–86.
6. CHU H. E-mail in scientific communication. In: 15th National Online Meeting. Medford: New Jersey: Learned Information, 1994:77–86.
7. ROIGER JF. Peer networking: making connections, the case for undergraduate oriented listservers. Paper presented at the Annual Meeting of the Southern States Communication Association, April 5–9, 1995, New Orleans, LA. ERIC Clearinghouse on Information Resources, Apr 95 (Eric Document No. ED384 081.)
8. STEINFIELD CW. Computer-mediated communications in the organization: using electronic mail at Xerox. In: Sypher BD, ed. Case Studies in Organizational Communication. New York: Guilford Press; 1990:282–94.
9. MILLER JP. Should you get wired? Libr J 1994 Feb;119:47–9.
10. LETTERIE GS, MORGENSTERN LL, JOHNSON L. The role of an electronic mail system in the educational strategies of a residency in obstetrics and gynecology. Obstet Gynecol 1994 Jul;84(1):137–9.
11. COULEHAN JL, WILLIAMS PC, NASER C. Using electronic mail for a small-group curriculum in ethical and social issues. Acad Med 1995 Feb;70(2):158–60.
12. SHERIDAN M, LEGROS E. Computer-assisted instruction using electronic mail. J Nurs Staff Dev 1995 Mar;11(2):100–3.
13. LABEAUSE J, SCHOCH NA. An electronic MLA journal club: description and evaluation of a pilot group. Paper presented at the Medical Library Association 96th Annual Meeting, Kansas City, MO, June 1–5, 1996.
14. SANDS, ET AL., op. cit.
15. NEILL RA, MAINOUS AG, CLARK JR, HAGEN MD. The utility of electronic mail as a medium for patient-physician communication. Arch Fam Med 1994 Mar;3(3):268–71.
16. STEINFIELD, op. cit.
17. MILLER, op. cit.
18. RILEY RH, PETRICK RM. Electronic mail (email) for anaesthesia departments. Anaesth Intens Care 1994;22(2):231–2.
19. SINGARELLA, ET AL., op. cit.
20. SANDS, ET AL., op. cit.
21. MILLER, op. cit.
22. MONTGOMERY, op. cit.
23. WOODWARD RP, ZOLET DI. The residents' computer bulletin board system: results of a 23-month pilot study. Md Med J 1993 Feb;42(2):169–73.
24. ROIGER, op. cit.
25. BERMAN Y. Discussion groups on the Internet as sources of information: the case of social work. Aslib Proceedings 1996 Feb;48(2):31–6.
26. BURTON PF. Electronic mail as an academic discussion forum. J Doc 1994 Jun;50(2):99–110.
27. BROWN WC. Message traffic analysis of GOVDOC-L and BUSLIB-L: two library-oriented LISTSERVS [master's thesis]. Chapel Hill: University of North Carolina at Chapel Hill, 1994.
28. ROSENBAUM H, SNYDER H. An investigation of emerging norms in computer mediated communications: an empirical study of computer conferencing. Proceedings of the 54th Annual Meeting of the American Society for Information Science 1991 Oct;28:15–23.
29. POLAND JM. Informal communication among scientists and engineers: a review of the literature. Science & Technology Libraries 1991 Spring;11:61–73.
30. GORMAN PN. Information Needs of Physicians. J Am Soc Info Sci 1995 46(10):729–36.
31. CRONIN B. Invisible colleges and information transfer. J Doc 1982;38:212–36.
32. O'HAVER T. Conversation with: Natalie A. Schoch, Ph.D. 1994 Oct.
33. MCCLURE CR. So what are the impacts of networking on academic institutions? Internet Research. 1994 Jun;4(2):2–6.
34. ROPER FW, MAYFIELD MK. Surveying knowledge and skills in the health sciences: results and implications. Bull Med Libr Assoc 1993 Oct;81(4):396–407.
35. NATIONAL LIBRARY OF MEDICINE. NLM Grant Awards—Fiscal Year 1995. NLM News 1995 Nov;50(6):10–13.
36. BERMAN, op. cit.
37. MILLER, op. cit.
38. HAMILTON K, KALB C. They log on, but they can't log off. (Internet addicts). Newsweek 1995 Dec 18;126(25):60(2).
39. SUTTER R. Living in the e-world: all you are seeing are words on a screen. Outlook (College Park) 1996 Apr 16;10(25):6.
40. BERMAN, op. cit.
41. BURTON, op. cit.
42. BERMAN, op. cit.
43. BURTON, op. cit.

Received May 1996; accepted July 1996

APPENDIX

MEDLIB-L questionnaire

Dear MEDLIB-L subscriber*,

My name is Sonya Shooshan, and I am a graduate student in Library and Information Services at the University of Maryland. I am conducting a descriptive survey of MEDLIB-L subscribers as part of a research project with a faculty member. You were chosen by random systematic sample to receive a copy of this questionnaire. Please take a few minutes to fill it out, and return to me by 24 April 1995 at shooshan@glue.umd.edu OR [postal mail address deleted]. All replies will be kept strictly confidential. Thank you for your help.

* If you do *NOT* believe you are a MEDLIB-L subscriber, and you do not currently receive mail from MEDLIB-L, check here and please return.
Thank you. [ ]

1. When did you join MEDLIB-L?
   [ ] less than 3 months ago
   [ ] 3 months–1 year ago
   [ ] more than 1 year ago

   Have you continuously subscribed to MEDLIB-L throughout this time?
   [ ] yes [ ] no

   Do you currently receive MEDLIB-L messages in digest form?
   [ ] yes [ ] no

   Have you ever used the nomail feature of MEDLIB-L?
   [ ] yes [ ] no

   IF YES, is MEDLIB-L currently set to nomail?
   [ ] yes [ ] no

2. What percentage of MEDLIB-L messages do you usually *READ*?
   [ ] 0–10% (almost never read)
   [ ] 11–40% (read a few/some items)
   [ ] 41–60% (about half of items)
   [ ] 61–90% (read most/majority of items)
   [ ] 91–100% (read all/almost all items)

3. Which of the following MEDLIB-L activities have you participated in? What is the approximate frequency for each activity?

	never	less than 1/month	1/month–1/week	more than 1/week
Ask questions	[ ]	[ ]	[ ]	[ ]
Answer questions	[ ]	[ ]	[ ]	[ ]
Initiate discussion	[ ]	[ ]	[ ]	[ ]
Reply to discussion	[ ]	[ ]	[ ]	[ ]
Post information	[ ]	[ ]	[ ]	[ ]

4. What have you *INITIATED* on MEDLIB-L? Check *ALL* that apply.
   [ ] reference request
   [ ] ILL
   [ ] information on products/procedures (CD-ROMs, vendors, JCAHO, etc.)
   [ ] offer/request duplicate journals/books
   [ ] discussion of professional or theoretical issues
   [ ] chat, humor, not-strictly-work communication
   [ ] other (please list)
   [ ] none of the above

   What have you *RESPONDED TO* on MEDLIB-L (either to the list or individual)? Check *ALL* that apply.
   [ ] reference request
   [ ] ILL
   [ ] information on products/procedures (CD-ROMs, vendors, JCAHO, etc.)
   [ ] offer/request duplicate journals
   [ ] discussion of professional or theoretical issues
   [ ] chat, humor, not-strictly-work communication
   [ ] other (please list)
   [ ] none of the above

5. How much time per *WEEK* do you spend on MEDLIB-L?

	work	home
less than 1 hour	[ ]	[ ]
1–3 hours	[ ]	[ ]
more than 3 hours–5 hours	[ ]	[ ]
more than 5 hours	[ ]	[ ]

6. How many *OTHER* listservs do you subscribe to?

[ ] 0 (only MEDLIB-L) [ ] 3–5
[ ] 1–2 [ ] over 5

7. What is your organizational affiliation? Check only *ONE*.

[ ] academic health sciences library [ ] other library (please list)
[ ] hospital library (including VA hospitals) [ ] other health sciences setting (please list)
[ ] health sciences info center (corporate, government, non-profit) [ ] other (please list)

If affiliation is *LIBRARY*, how many other *PROFESSIONAL* library staff work with you?

[ ] 0 (only me) [ ] over 5
[ ] 1–5

8. What is your primary *OCCUPATION*? Check only *ONE*.

[ ] professional library staff [ ] health care professional (please list)
[ ] other library staff [ ] other (please list)

How many years of experience do you have in the *OCCUPATION* above?

[ ] less than 2 years [ ] more than 5 years–10 years
[ ] 2–5 years [ ] more than 10 years

9. Please list your country of employment (or residence if unemployed or retired).

If you have comments about your utilization of MEDLIB-L, please add them below. Thank you for your time!